

REMARKS

Entry of the foregoing and reconsideration of the application identified in caption, pursuant to and consistent with 37 C.F.R. §1.111 and in light of the remarks which follow, are respectfully requested.

In the Official Action, claims 5-29 stand objected to for depending from a multiple dependent claim. However, claim 4 was amended to depend (only) from claim 1 in the Preliminary Amendment filed on December 20, 2005. As such, this objection is moot, and consideration of claims 5-29 in the present application is respectfully requested.¹

Claims 1-3 stand rejected under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2004/0151450 (*Wadsworth et al*). Withdrawal of this rejection is respectfully requested for at least the following reasons.

Independent claim 1 is directed to an elongate waveguide for guiding light, comprising: a core region, comprising an elongate region of relatively low refractive index; and a cladding region, comprising elongate regions of relatively low refractive index interspersed with elongate regions of relatively high refractive index, including, in a transverse cross-section of the waveguide, a relatively high refractive index boundary region that surrounds the core region and has either (1) at most two-fold rotational symmetry or (2) a rotational symmetry that reduces the rotational symmetry of the waveguide to at most two-fold rotational symmetry, the symmetry of the boundary region resulting at least in part from azimuthal variations

¹ It appears that the Examiner has already considered the subject matter of claims 5-8 in the outstanding Official Action in view of the rejection of such claims under 35 U.S.C. §103(a).

therein, which are substantially uncharacteristic of the cladding region.

It is well established that "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). For an anticipation to exist, "[t]he identical invention must be shown in as complete detail as is contained in the . . . claim." *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

In the present case, *Wadsworth et al* does not disclose each feature recited in independent claim 1, and as such fails to constitute an anticipation of such claim. For example, *Wadsworth et al* does not disclose a core region, comprising an elongate region of **relatively low refractive index**; and a **relatively high refractive index** boundary region that surrounds the core region, as recited in claim 1. In this regard, relying on the optical fiber shown in FIG. 7 of *Wadsworth et al*, the Examiner has alleged that the claimed core region corresponds to element 430 in FIG. 7, and the claimed cladding region corresponds to elements 440 and 450. See Official Action at page 2. However, with regard to the refractive indexes of the regions of such optical fiber, *Wadsworth et al* discloses the following at paragraph [0085]:

The effective refractive index of the core thus decreases radially outwards from a maximum in region 430, through a local minimum in region 440, increases to a higher figure in region 450 (but not as high as in region 430) and then decreases again to the index of the bulk silica that forms the cladding 470.

Therefore, *Wadsworth et al* discloses that each of regions 440, 450 and 470 has a refractive index that is lower than that of region 430. As such, it is clear that the optical fiber of FIG. 7 does not correspond to the claimed elongate waveguide which

includes an elongate region of the core region of **relatively low refractive index**, and a **relatively high refractive index** boundary region.

For at least the above reasons, it is apparent that independent claim 1 is not anticipated by *Wadsworth et al.* Accordingly, withdrawal of the above rejection is respectfully requested.

Claims 31-34 stand rejected under 35 U.S.C. §102(e) as being anticipated by *Wadsworth et al.* Withdrawal of this rejection is respectfully requested for at least the following reasons.

Independent claim 31 recites a method of forming a photonic crystal fibre including the steps: forming a preform comprising an elongate, relatively low refractive index core region, and, surrounding the core region, an elongate cladding region, comprising elongate regions of relatively low refractive index interspersed with elongate regions of relatively high refractive index; forming, at the interface between the core region and the cladding region, a boundary region, comprising one or more relatively high refractive index regions, which has at most two-fold rotational symmetry due to azimuthal variations, which are uncharacteristic of the cladding region; and drawing the pre-form into a fibre, which has no more than two-fold rotational symmetry about any longitudinal axis.

Wadsworth et al fails to disclose each feature of independent claim 31, and as such fails to constitute an anticipation of such claim. For example, *Wadsworth et al* does not disclose forming a preform comprising an elongate, **relatively low refractive index** core region; and forming, at the interface between the core region and the cladding region, a boundary region, comprising one or more **relatively high refractive index regions**, as recited in claim 31. By comparison, as discussed

above, *Wadsworth et al* discloses that in the optical fiber of FIG. 7, each of regions 440, 450 and 470 has a refractive index that is **lower** than that of region 430. Quite clearly, the optical fiber of FIG. 7 does not anticipate the claimed process in which a preform comprising an elongate, relatively low refractive index core region, and a boundary region comprising one or more relatively high refractive index regions, are formed.

Wadsworth et al also fails to disclose each feature of independent claim 34. In this regard, it is noted that the Patent Office has relied on paragraphs [0026] and [0035] of *Wadsworth et al* for disclosing birefringence and rotational symmetry characteristics of its waveguide. See Official Action at pages 2-3. However, such disclosures merely relate to the characteristics of the material as a whole.

Wadsworth et al has no disclosure of arranging a plurality of elongate members into a pre-form stack comprising an elongate cladding region enclosing an elongate core region, the members in the cladding region forming a characteristic pattern, apart from at least one member in a boundary region, at or near to the core region, which breaks the characteristic pattern and renders the boundary region, in the transverse cross-section, no more than two-fold rotationally symmetric about any axis, as recited in claim 34.

For at least the above reasons, it is apparent that *Wadsworth et al* fails to anticipate independent claims 31 and 34. Accordingly, withdrawal of the above rejection is respectfully requested.

Claims 4-8 stand rejected under 35 U.S.C. §103(a) as being obvious over *Wadsworth et al* in view of U.S. Patent No. 7,106,933 (*Han*). Withdrawal of this rejection is respectfully requested for at least the following reasons.

It is noted that each of claims 4-8 directly or indirectly depends from independent claim 1. For at least the reasons discussed above with respect to claim 1, Applicants submit that *Wadsworth et al* does not disclose or suggest a core region, comprising an elongate region of **relatively low refractive index**; and a **relatively high refractive index** boundary region that surrounds the core region.

Han fails to cure the above-described deficiencies of *Wadsworth et al*. In this regard, the Patent Office has relied on *Han* for disclosing boundary nodes having specific characteristics. See Official Action at pages 4-5. However, even if *Han* would have been combined with *Wadsworth et al* in the manner suggested, the resulting combination nevertheless fails to disclose or suggest a core region, comprising an elongate region of relatively low refractive index; and a relatively high refractive index boundary region that surrounds the core region, as recited in claim 1.

For at least the above reasons, it is apparent that claims 4-8 are non-obvious over the applied art. Accordingly, withdrawal of the §103(a) rejection is respectfully requested.

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order, and such action is earnestly solicited.

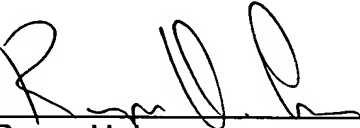
If there are any questions concerning this paper or the application in general,
the Examiner is invited to telephone the undersigned.

Respectfully submitted,

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